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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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10/579,229

04/06/2007

Vasso Apostolopoulos

3489-103

1201

6449

7590

12/30/2009

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SUITE 800

WASHINGTON, DC 20005

EXAMINER

CHONG, KIMBERLY

ART UNIT

PAPER NUMBER

1635

NOTIFICATION DATE

DELIVERY MODE

12/30/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTO-PAT-Email@rfem.com

|                              |                                      |  |  |
|------------------------------|--------------------------------------|--|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/579,229 | <b>Applicant(s)</b><br>APOSTOLOPOULOS ET AL. |  |
|                              | <b>Examiner</b><br>KIMBERLY CHONG    | <b>Art Unit</b><br>1635                      |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 September 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 50-98 is/are pending in the application.
- 4a) Of the above claim(s) 56, 57 and 69-98 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 50-55 and 58-69 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 May 2006 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>03/07/08, 09/22/09</u> .                                      | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election with traverse of Group II, claims 50-69 in the reply filed on 09/14/2009 is acknowledged. The traversal is on the ground(s) that groups I, II, III form a single inventive concept. Applicants argument is persuasive the groups I, II and III will be examined together.

The requirement is still deemed proper with respect to the remaining groups and is therefore made FINAL.

### ***Status of the Application***

Claims 50-98 are pending. Claims 50-55 and 58-69 are currently under examination. Claims 56, 57 and 70-98 and non-elected species are withdrawn as being drawn to a non-elected invention.

### ***Information Disclosure Statement***

The submission of the Information Disclosure Statements on 03/17/2009 and 09/22/2009 is in compliance with 37 CFR 19.7. The information disclosure statements have been considered by the examiner and signed copies have been placed in the file.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 50, 52 and 53 rejected under 35 U.S.C. 102(b) as being anticipated by Sasaki et al. (Eur. J. Immunol. 1997, Vol. 27:3121-3129).

The claims are drawn to a compound comprising a conjugate of a polynucleotide or oligonucleotide molecule, a carrier comprising at least one aldehyde group and wherein the polynucleotide is in the range of 5 bases to 10 kilobases.

Sasaki et al. teach a compound comprising a DNA polynucleotide and a carrier comprising a mannan molecule, wherein the polynucleotide is in the claimed range (see paragraph 2.1 that references a previous report that describes making the DNA polynucleotide).

Thus, Sasaki et al. anticipates the claims 50, 52 and 53.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 50, 52-55, 59-69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki et al. (Eur. J. Immunol. 1997, Vol. 27:3121-3129) as relied

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upon above and in further view of Apostolopoulos et al. (Eur. J. Immunol. 2000, of record cited on IDS filed 03/07/2008), Liu et al. (Vaccine 20, 2002, pp 42-48) and Ming et al. (Pharmacology Reviews 2002, of record cited on IDS filed 09/22/2009).

The claims are drawn to a compound comprising a conjugate of a polynucleotide or oligonucleotide molecule, a carrier comprising at least one aldehyde group and a suitable linker wherein the polynucleotide is in the range of 5 bases to 10 kilobases, wherein the polynucleotide or oligonucleotide comprises an expression cassette comprising a promoter linked to a protein, wherein the protein is an antigen, , wherein the carrier comprises a plurality of aldehyde groups, wherein the carrier is a ligand, wherein the carrier is an oxidized mannan and the linker is a polycation.

Sasaki et al. teach a compound comprising a DNA polynucleotide and a carrier comprising a mannan molecule, wherein the polynucleotide is in the claimed range (see paragraph 2.1 that references a previous report that describes making the DNA polynucleotide). Sasaki et al. do not teach the carrier comprises a plurality of aldehyde groups and do not teach the conjugate further comprising an expression cassette encoding a protein.

Apostolopoulos et al. teach the use of oxidized mannan molecules that are conjugated to molecules wherein the mannan, which is recognized by a cell surface receptor, allows the complex to enter the cell more rapidly and direct subsequent immune responses more efficiently (see entire reference).

Liu et al. teach expression constructs comprising cytokines (see page 43) that wherein combined with HIV DNA vaccines, allows for induction of strong antigen-specific immune responses (see at least Figures 1 and 2).

Ming et al. teach polycation linkers and methods of conjugation of molecules to DNA (see at least pages 572-573).

It would have been obvious to one of skill in the art at the time the invention was made to oxidize the mannan and use in a complex comprising the DNA vaccine given Apostolopoulos et al. teach the presence of the additional aldehyde groups allow for more efficient entry into the cytoplasm of the cell and mediation of the immune response. One would have further combined an antigen into said complex to enhance the immune response more efficiently as taught by Liu et al. It would have been obvious to use a polycation linker for conjugations given Ming et al. teach methods of conjugation of carriers to DNA molecules.

Thus in the absence of evidence to the contrary, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Claims 50, 51 and 58-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Azzam et al. (Macromol Symp. 2003 of record cited on International Search Report filed 05/12/2006) and Tuschl et al. (US 2004/0259247).

The claims are drawn to a compound comprising a conjugate of a polynucleotide or oligonucleotide molecule, a carrier comprising at least one aldehyde group and a

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suitable linker wherein the polynucleotide is in the range of 5 bases to 50 kilobases and wherein the polynucleotide or oligonucleotide is a siRNA.

Azzam et al. teach an efficient dextran carriers that can be used to deliver nucleic acid molecules to cells wherein the dextran carrier is oxidized (see entire reference).

Azzam et al. teach this carrier can be conjugated to molecules and delivery to cells.

Tuschl et al. teach the use of dsRNA for mediation of RNA interference in cells. Tuschl et al. teach dsRNA can be delivered to any cell and can be delivered using common gene transfer techniques (see at least paragraphs 0028-0035).

It would have been obvious to conjugate the carrier taught by Azzam et al. to delivery dsRNA as taught by Tuschl et al. to cells. Given the improved delivery and efficient transfection into cells as taught by Azzam et al., one of ordinary skill would have clearly conjugated this carrier to the dsRNA of Tuschl et al. and would have reasonably expected to be able to make the conjugate based on the prior art references.

Thus in the absence of evidence to the contrary, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

### **Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimberly Chong whose telephone number is 571-272-3111. The examiner can normally be reached Monday thru Friday between 7-4 pm.

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If attempts to reach the examiner by telephone are unsuccessful please contact Tracy Vivlemore at 571-272-2914. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public. For more information about the PAIR system, see <http://pair-direct.uspto.gov>.

For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199.

/Kimberly Chong/  
Primary Examiner  
Art Unit 1635